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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/721,249

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AIRI.P0104USA

3237

7590

06/17/2004

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EXAMINER

FETZNER, TIFFANY A

ART UNIT

PAPER NUMBER

2859

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/721,249

Applicant(s)

SRINIVASAN, RAVI

Examiner

Tiffany A Fetzner

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 07 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2-6,9,11-14 and 16-49 is/are pending in the application.
- 4a) Of the above claim(s) 20-41 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-6,9,11-14,16-19 and 42-48 is/are rejected.
- 7) ☒ Claim(s) 49 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **Final Action**

### ***Response to Arguments***

1. Applicant's arguments with respect to **claims 2-19** and **42** have been considered but are moot in view of the new ground(s) of rejection. Due to applicant's arguments regarding the cited but not applied art in the first office action, (i.e. **references c-l**, cited below), these references have also been overcome, due to applicant's arguments, and are no longer considered to be prior art by the examiner.
2. The examiner has applied the **Srinivasan PCT** publication **WO 98/37438** published August 27th 1998, as a **102 (b)** reference below, because Figures 13a, 4b, and 4c in combination with the teachings of the reference appear to teach the invention of the instant application, by applicant, more than a year before applicant's priority date. The examiner notes that capacitor components C2, and C3 form an electrical coil connection between the path of coil 1 and coil 2 (i.e. applicant's coil 3 and coil 2 respectively.). Therefore, even though figure 13A shows some minor-overlapping the structure still meets the requirements of the claims.
3. In review of applicant's figures of the instant application, (i.e. Figures 5, 6a, 7a, and 8a), it appears that applicant's structural figures do not require overlap, but instead require that "the bottom of applicant's coil 2 is simultaneously the top of applicant's coil 3, while the bottom of applicant's coil 3 is simultaneously the bottom of applicant's coil 1, and the top of applicant's coil 2 is simultaneously the top of applicant's coil 1, in an integrated structure". If this is the case, the examiner recommends that applicant state in the body of the claim that "**the coil paths, with appropriate description of the coil**

**being described simultaneously adjoin one another without overlap", as shown in Figures 5, 6a, 7a, and 8a, or that applicant state that "without overlapping the bottom of applicant's coil 2 is simultaneously the top of applicant's coil 3, while the bottom of applicant's coil 3 is simultaneously the bottom of applicant's coil 1, and the top of applicant's coil 2 is simultaneously the top of applicant's coil 1, in an integrated structure", because this would eliminate the Srinivasan PCT publication WO 98/37438 published August 27th 1998, which is applicant's own earlier work, from constituting prior art.**

4. The examiner notes that because capacitors C2 and C3 combine the paths of **Srinivasan PCT publication WO 98/37438 coil 1 and coil 2 (i.e. applicant's coil 3 and coil 2 respectively)**, there is a common coil path, connecting these coils, even though in figure 13A there is some overlap. To solve this problem, and clarify the coil structure of the instant application, the examiner suggests the solution above, since **applicant's Figures 5, 6a, 7a, and 8a** provide original specification support, without raising the issue of new matter.

5. Considering the fact that the art applied is applicant's own earlier work, the applicant is encouraged to contact the examiner for a telephonic interview, prior to responding to this office action, if applicant believes a telephonic interview would be helpful in ensuring that all the issues raised below are addressed in a manner which furthers the prosecution of the instant application.

### **Inventive entity / priority concern**

6. The examiner notes that although the inventive entity of the instant application and the U.S. Patent No. 6,150,816 is the same, there is a lack of pendency between the instant application and issued patent 6,150,816 of 1 day. U.S. Patent No. 6,150,816 issued Tuesday November 21st 2000, was filed February 24th 1998 and claims priority to US provisional application 60/039,152 dated February 25th 1997. The instant application was filed Wednesday November 22nd 2000. Additionally, the examiner notes that US provisional application 60/039,152 dated February 25th 1997; is also the priority document to the **Srinivasan** PCT publication WO 98/37438 published August 27th 1998; which is a 102 (b) reference against the claims of the instant application.

### **Specification**

7. The objection to the disclosure from the previous office action is withdrawn in view of applicant's April 7<sup>th</sup> 2004 amendment. [See the April 7<sup>th</sup> 2004 amendment page 9].

### **Drawings**

8. Drawing pages 3-14 submitted March 18<sup>th</sup> 2004 which comprise FORMAL DRAWING pages 1-12 are accepted by the examiner as formal drawings, and overcome the drawing objections of the last office action.

9. Drawing page 2 of the 14 drawing pages submitted March 18<sup>th</sup> 2004 shows the applicant's proposed drawing changes to figures 1a, 1b, 2a, 2b, 3a, 3b, 4a, and 4b; which are shown in FORMAL DRAWING format on drawing pages 3-6 of the March 18<sup>th</sup> 2004 submission, identified as FORMAL DRAWING pages "1/12, 2/12, 3/12, and 4/12".

Art Unit: 2859

10. Drawing page 1 of the 14 drawing pages submitted March 18<sup>th</sup> 2004 shows the applicant's proposed drawing changes to figure 9; which is shown in FORMAL DRAWING format on page 12 of the March 18<sup>th</sup> 2004 submission, identified as FORMAL DRAWING page "**10/12**".

***Election***

11. The examiner notes that due to applicant's amendment of April 7<sup>th</sup> 2004, which added multiple limitations and eliminated the structural components that linked species 1 (i.e. previous **claims 2-19, and 42**) with species 2 (i.e. **withdrawn claims 20-41**) from the previous office action, that **amended claim 2** is no longer a generic claim. Therefore applicant's April 7<sup>th</sup> 2004 written election of species 1, (i.e. previously pending **claims 2-6, 9, 11-14, 16-19, 42, and newly added claims 43-49**) is now patentably distinct from non-elected species 2 (i.e. **withdrawn claims 20-41**)

12. **Claims 7, 8, 10, and 15 are canceled**, as per applicant's April 7<sup>th</sup> amendment

13. Additionally, as per applicant's April 7<sup>th</sup> amendment **Amended claim 2 and dependent claims 3-6, 9, 11-14, 16-19 and 42-49** are currently pending.

***Claim Rejections - 35 USC § 102***

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. **Claims 2-6, 9, 11-14, 16-19, and 42-48** are rejected under **35 U.S.C. 102(b)** as being anticipated by **Srinivasan** PCT international publication WO 98/37438 published

Art Unit: 2859

August 27<sup>th</sup> 1998 which is more than 1 year before applicant's filing date, therefore even through this reference is one of applicant's own earlier publications is available as prior art as was indicated in the previous office action.

16. With respect to (Currently Amended) **claim 2**, **Srinivasan** teaches shows [See page 7 line 37 through page 9 line 3 page 21 lines 1-40; and figure 13a] "An integrated radio-frequency coil array, comprising: "a first coil spanning a first field of view (FOV);" (i.e. **Srinivasan coil #3** shown in **figure 13a** is considered to be equivalent to applicant's "first coil spanning a first field of view (FOV);" [See **Srinivasan coil #3** shown in **figure 13a**] "a first driving means for driving the first coil to image" [See the programmable transmit/receive (T/R) driver switch for coil #3 of **Srinivasan** figure 7F page 8 lines 28-33; and page 21 lines 31-36] "a second coil spanning a second FOV" (i.e. **Srinivasan coil #2** shown in **figure 13a** is considered to be equivalent to applicant's "second coil spanning a second field of view (FOV);" [See **Srinivasan coil #3** shown in **figure 13a**] "a second driving means for driving the second coil to image;" [See the programmable transmit/receive (T/R) driver switch for coil #2 of **Srinivasan** figure 7F page 8 lines 28-33; and page 21 lines 31-36] "a third coil spanning a third FOV, wherein a combined FOV of the second and third coil is substantially equivalent to the first FOV"; (i.e. **Srinivasan coil #1** shown in **figure 13a** is considered to be equivalent to applicant's "third coil spanning a first field of view (FOV);" [See **Srinivasan coil #1** shown in **figure 13a**] "a third driving means for driving the third coil to image", [See the programmable transmit/receive (T/R) driver switch for coil #1 of **Srinivasan** figure 7F page 8 lines 28-33; and page 21 lines 31-36] "wherein at least two coils can

be driven simultaneously to obtain a combined image and each coil can be driven independently to obtain an image: and a first common coil path that includes at least one reactive component, wherein the second coil and the third coil share the first common coil path.” [See page 7 line 37 through page 9 line 3 page 21 lines 1-40; and figure 13a]

17. With respect to **claim 3**, **Srinivasan** shows and teaches that the second coil and the third coil are substantially isolated from one another and from the first coil”, because as defined by the examiner above the **Srinivasan** reference applied this limitation requires that coils #2 and coil #1 are isolated from coil 3, which is shown in figure 13a and taught on page 8 lines 12-33] The same reasons for rejection, that apply to **claim 2**, also apply to **claim 3**.

18. With respect to **claim 4**, **Srinivasan** shows “the first coil” (i.e. **Srinivasan coil #3**) “has an imaging field of view (FOV) and the second coil” (i.e. **Srinivasan coil #2**) “and the third coil” (i.e. **Srinivasan coil #1**) combine to span a near identical B field to that of the first coil” (i.e. **Srinivasan coil #3**) “over the imaging FOV”. [See **Srinivasan** on page 8 lines 12-33, page 21 and Figures 4b and 4c in combination with figure 13a where figure 4b shows the effective current and FOV of **Srinivasan coil #3**, and figure 4c shows that the FOV's of **Srinivasan coil's #1**, and **2**, span the same FOV area as Figure 4b **Srinivasan coil #3**] The same reasons for rejection, that apply to **claim 2**, also apply to **claim 4**.

19. With respect to **claim 5**, **Srinivasan** directly shows and suggests from the coil configuration of figures 4b, 4c, and 13a, that “the second coil “(i.e. **Srinivasan coil #2**)



Art Unit: 2859

“and the third coil” (i.e. **Srinivasan coil #1**) “are a subset of the first coil” (i.e. **Srinivasan coil #3**) [See figures 4b, 4c, and 13a in combination; page 7 line 37 through page 9 line 3 page 21 lines 1-40]. The same reasons for rejection, that apply to **claim 2**, also apply to **claim 5**.

20. With respect to **claim 6**, **Srinivasan** teaches lines 37-38 that “the second coil” (i.e. **Srinivasan coil #2**) “and the third coil” (i.e. **Srinivasan coil #1**) “have substantially the same dimensions”. The same reasons for rejection, that apply to **claim 2**, also apply to **claim 6**.

21. With respect to **claim 9**, **Srinivasan** teaches that “the reactive elements” (I,e, components c1, c2, c3 in figure 13a) “are chosen to cancel the coupling between the second coil and the third coil. [See page 21 lines 31-33 where each coil has its own capacitor bank, and page 21 lines 9-21 where each capacitor is taught to control the tuned value of the coil and enables the coils to be isolated (i.e. the canceling out of the coupling makes the respective coils invisible to one another, or isolated) from one another via the shorting and overlap] The same reasons for rejection, that apply to **claims 2, 7, 8**, also apply to **claim 9**.

22. With respect to **New claim 11**, **Srinivasan** directly shows that “the second coil” (i.e. **Srinivasan coil #2**) “and the third coil” (i.e. **Srinivasan coil #1**) “are situated symmetrically within the first coil.” [See figures 13a, and 4b and 4c; page 8 lines 12-33 ]. The same reasons for rejection, that apply to **claim 2**, also apply to **claim 11**.

23. With respect to **New claim 12**, **Srinivasan** directly teaches that “the first coil, the second coil and the third coil image simultaneously, independent of each other.” [See

page 8 line 2 through page 9 line 3.] The same reasons for rejection, that apply to **claim 2**, also apply to **claim 12**.

24. With respect to **New claim 13**, **Srinivasan** directly teaches that “the first coil and a combination of the second coil and the third coil image simultaneously.” [See page 8 lines 23-33 ] The same reasons for rejection, that apply to **claim 2**, also apply to **claim 13**.

25. With respect to **New claim 14**, **Srinivasan** directly teaches that that “the second coil” (i.e. **Srinivasan coil #2**) “and the third coil” (i.e. **Srinivasan coil #1**) image simultaneously.” [See page 8 lines 23-33.] The same reasons for rejection, that apply to **claim 2**, also apply to **claim 14**.

26. With respect to **New claim 16**, **Srinivasan** directly shows that coil array design is selected from the group consisting of a birdcage, a solenoid, an Alderman-Grant resonator, a transverse electromagnetic wave (TEM) resonator, a saddle, a counter rotating coil CRC pair, a Helmholtz pair, a surface loop coil, and a surface coil.” [See Figures 3-13a] The same reasons for rejection, that apply to **claim 2**, also apply to **claim 16**.

27. With respect to **New claim 17**, **Srinivasan** teaches that “the first coil, the second coil and the third coil are configured from the group consisting of a high-pass configuration, a low-pass configuration, a band-pass configuration and a band-stop configuration.” [See page 22 lines 32-40.] The same reasons for rejection, that apply to **claim 2**, also apply to **claim 17**.

28. With respect to **New claim 18**, **Srinivasan** shows that “the first coil, the second coil and the third coil” shown in Figure 6 “are volume type coils” [See Figure 13A, page 21] The same reasons for rejection, that apply to **claim 2**, also apply to **claim 18**.

29. With respect to **New claim 19**, **Srinivasan** suggests from figures 4b and 4c in combination that “the first coil, the second coil and the third coil are surface type coils” [See Figures 4b, 4c, 12a, 12b page 20 lines 9-37] The same reasons for rejection, that apply to **claim 2**, also apply to **claim 19**.

30. With respect to **claim 42**, **Srinivasan** teaches and shows “a coil array as described in **claim 2**,” [See the rejection of **claim 2** which need not be reiterated] “and a means for processing RF signals which are at least one of received from the coil array and transmitted from the coil array in order to obtain a resonance image/analysis.” [See figure 14 the microprocessor computer control, and the channel multiplexer.] The same reasons for rejection, that apply to **claim 2** also apply to **claim 42**.

31. With respect to **New claim 43**, **Srinivasan** teaches and shows from figure 13a and page 21 lines 9-21 that that “the second coil” (i.e. **Srinivasan coil #2**) “and the third coil” (i.e. **Srinivasan coil #1**) “are situated such that the first common coil path falls over a central virtual ground plane of the first coil.” The same reasons for rejection, that apply to **claim 2** also apply to **claim 43**.

32. With respect to **New claim 44**, **Srinivasan** teaches “each coil is driven simultaneously to obtain an independent image.” [See Figure 7f page 8 through page 9 line 3, page 21 lines 38-36 where each coil images a different frequency range, while all

Art Unit: 2859

three coils are functioning] The same reasons for rejection, that apply to **claim 2** also apply to **claim 44**.

33. With respect to **New claim 45**, **Srinivasan** teaches “each coil is driven individually to obtain an independent image. [See Figure 7f, page 8 through page 9 line 3, page 21 lines 38-36] The same reasons for rejection, that apply to **claim 2** also apply to **claim 45**.

34. With respect to **New claim 46**, **Srinivasan** shows that “the first driving means includes a first inductive coupling loop coupled to the first coil, the second driving means includes a second inductive coupling loop coupled to the second coil, and the third driving means includes a third inductive coupling loop coupled to the third coil, and wherein the second inductive coupling loop and the third inductive coupling loop are overlapped to cancel a net mutual flux between the second inductive coupling loop and the third inductive coupling loop.” [See figure 13a and the text of page 21, the coils shown each contain loops and are driven by individual switch driving means.] The same reasons for rejection, that apply to **claim 2** also apply to **claim 46**.

35. With respect to **New claim 47**, **Srinivasan** shows that “the first driving means is selected from the group consisting of inductive coupling and capacitive coupling” [See figure 13a]. The same reasons for rejection, that apply to **claim 2** also apply to **claim 47**.

With respect to **New claim 48**, **Srinivasan** shows that “the second coil” (i.e. **Srinivasan coil #2**) “and the third coil” (i.e. **Srinivasan coil #1**) “are driven across the reactive

Art Unit: 2859

component" (i.e. capacitor c2)The same reasons for rejection, that apply to **claim 2** also apply to **claim 48**.

36. With respect to **claims 20-41** these claims are withdraw from consideration as being drawn to a non-elected invention.

***Allowable Subject Matter***

37. With respect to New **claim 49**, this claim is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, because the prior art of record does not show that "the first driving means is a rectangular loop and the second and third driving means are combined into a figure eight loop" in combination with the limitations of **claim 2**.

38. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

39. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2859

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

**Prior Art made of Record**

40. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

**A) Molyneaux et al.**, US patent 5,757,189 issued May 26th 1998. [See figures 2, 2a, 2b, 2c]

**B) Vij** US patent 5,682,098 issued October 28<sup>th</sup> 1997. Which shows an open quadrature array with three figure-8 shaped surface coils. three

**C) Srinivasan et al.**, US patent 5,602,479 issued February 11<sup>th</sup> 1997 [See figures 10, 11, 6, 7, 1 and 2]

**D) Murphy-Boesch et al.**, US patent 5,194,811 issued March 16<sup>th</sup> 1993 [See Figure 2b, 4a, 8a]

**E) Srinivasan** US patent 6,177,797 B1 issued January 23<sup>rd</sup> 2001 with an effective date of December 19<sup>th</sup> 1996.

**F) Srinivasan** US patent 5,999,000 issued December 7<sup>th</sup> 1999 with an effective date of November 8<sup>th</sup> 1996.

**G) Wong** US patent 6,285,189 B1 issued September 4<sup>th</sup> 2001 filed September 4<sup>th</sup> 1999. [See figures 3c 4a, 4b, 4c2b, 2d, 2e, 1]

**H) Hayes** US patent 4,694,255 issued September 15<sup>th</sup> 1987. [See figure 10, 2b, 12].


**I) Srinivasan** US patent 5,777,474 issued July 7<sup>th</sup> 1998.

**Conclusion**

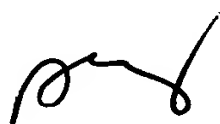
Art Unit: 2859

41. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

42. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(703) 872-9306**.



TAF  
June 14, 2004



Diego Gutierrez  
Supervisory Patent Examiner  
Technology Center 2800